CC256x Bluetooth SIG Certification

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Introduction

This page will serve to speed up Bluetooth SIG certification using the CC256x Bluetooth device. The certification is done by the Bluetooth SIG(Special Interest Group) that defines the Bluetooth specification and standards as well as the testing required to brand the end product with the Bluetooth logo.

Nomenclature

| Abbreviation/Acronym	Definition
Bluetooth SIG	Bluetooth Special Interest Group
BQE	Bluetooth Qualification Expert
HCI	Host Controller Interface
QDID	Qualified Design ID

Testing

Our device has to be put under test mode to run the automated SIG tests using a Bluetooth tester. This basically consists of 3 commands being sent to the CC256x through the HCI UART interface.
See here for details: BT RF SIG Mode (http://processors.wiki.ti.com/index.php/CC256x_Testing_Guide#BT_RF_SIG_Mode%7C)

Bluetooth certification

In order to release a *Bluetooth* product to market, the solution need to be qualified.

1. If a TI reference designs (CC256x QFN EM) is strictly followed and the profiles are not changed, the customers do not need to do certification again. They can do the End Product Listing (EPL) on SIG website for free.
2. If you create your own proprietary profiles, it is optional for you to do certification.
3. There is not a fine line to tell whether or not a additional certification is needed (For example RF test cases, which are strictly dependent on RF circuitry). Normally, it Should be up to a Bluetooth Qualification Expert (BQE) to tell. The BQE is normally from an authorized testing houses (such as 7Layers or AT4wireless).
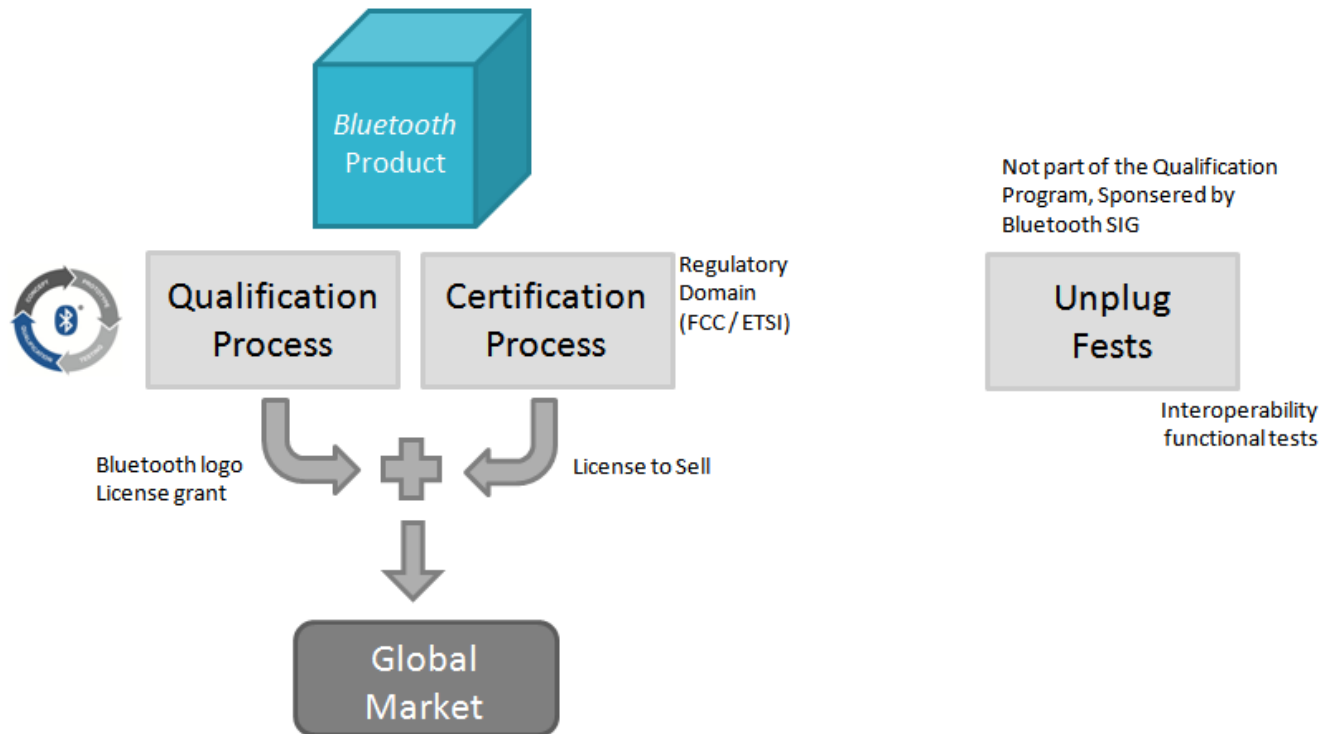

Qualification Process

- Qualification and Declaration Processes (https://www.bluetooth.org/en-us/test-qualification/qualification-overview%7CBluetooth) - **New**
- Program Start Guide (https://www.bluetooth.org/DocMan/handlers/DownloadDoc.ashx?doc_id=292214%7CCompliance) - **New**

Initial Questions

- Are you using a 3rd party qualified design? (Following CC256x QFN EM reference design)

  - If YES, reuse TI Subsystems (See Qualified Design Listing section)
  - If NO, follow steps to qualify your own Bluetooth design
- What product type are you using?

  - End Product, Subsystem, Component etc. Understanding intention and benefits of product types is Key.
- Are you making any changes to the qualified design during implementation into your product?

  - If adding new functionality defined in adopted Specification (new PICS items) then new qualification is required
  - If simply referencing someone else's complete qualified design you may only need EPL

So there are basically two roads to take:

1. If the design is qualified as a Subsystem product type, a new QDL/QDID is NOT required if the designs are implemented as originally qualified and are designed to combined with complimentary Subsystems in an End Product. From Qualification perspective, only an EPL associated with the implemented Subsystems is required (no Qualification testing needed).
2. If a Member wishes to create a new QDL/QDID using Subsystems, the complete design must be reassessed to ensure it meets the current Qualification requirements. You are not allowed to inherit evidence, rather assess to confirm the evidence meets the current test requirements and perform any new test cases introduced since the original Qualification.
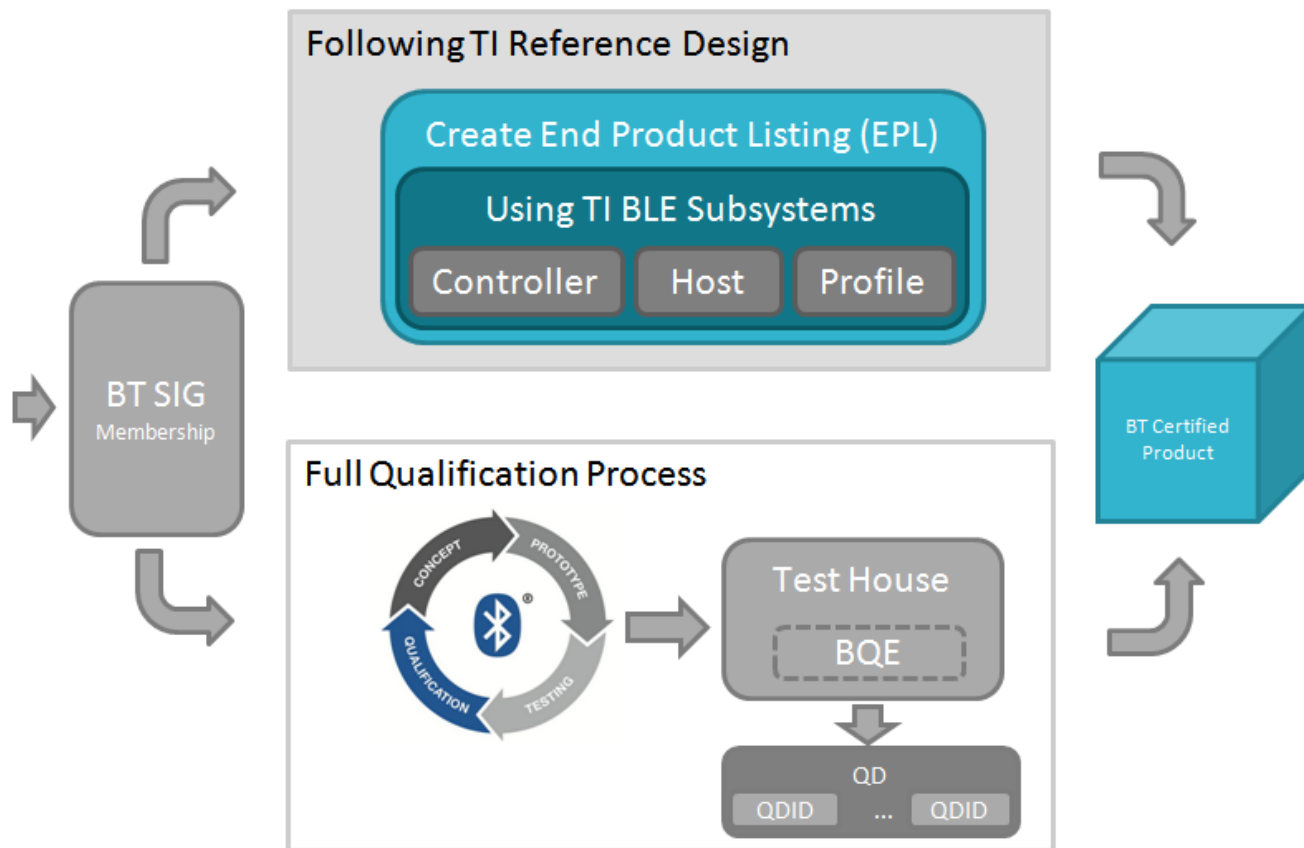
Design Product Types

1. *Bluetooth* **End Product**
2. *Bluetooth* **Controller Subsystem Product**
3. *Bluetooth* **Host Subsystem Product**
4. *Bluetooth* **Profile Subsystem Product**
5. *Bluetooth* Component Product
6. *Bluetooth* Test Equipment
7. *Bluetooth* Development Tool

		Component	Subsystem	End Product
Intention		Allow partial product to be qualified and require that Component integration must always result in a new Qualified Design Listing (QDL).	Allow partial product types (Controller or Host) to be qualified with intention and ability to be combined to meet definition of End Product type.	Allow qualification for entire Core Configuration in one Qualified Design (QDL).
Benefit		Testing inheritance. Conformance testing for the Component's qualified layers can be inherited, provided that: ■ Assessment Date of Component within the last 3 years limit ■ The integration complies with the tested Component's RIN ■ No compliance change is made to the tested Component ■ The integration results in a Bluetooth Subsystem or End Product	When used correctly, no further qualification is required if matching two or more complementary Subsystems. ■ Applies if the combined Subsystems are used as designed and originally qualified.	End Products can be combined or sold as is without limitations on the license. End Products represent a complete Bluetooth wireless solution. ■ Changes to End Products are assessed in accordance with the current PRD, section 2.2 and via the Product Change Checklist.

End Product Listing

"The End Product Listing (EPL) is free of charge and constitutes the Bluetooth SIG's definitive list that _publicly displays (http://www.bluetooth.com/Pages/Product-Directory.aspx)_ qualified market products on www.bluetooth.com. Here, consumers can verify that the manufacturers have fully met the requirements of qualification and be better assured of interoperability with other Bluetooth enabled products. If shipping your product, having your product listed on the EPL will indicate to customs officials that the product is genuine and meets both the requirements of qualification and trademark licensing, preventing the product from being destroyed by customs.

The End Product Listing (EPL) tracks the usage of a qualified design within new Bluetooth product implementations released to the market.

_The Bluetooth SIG will market your EPL product on www.bluetooth.com within the Product Directory. Bluetooth.com receives approximately half a million monthly visits with the Product Directory. If you would like to know how to create an EPL, please follow the _easy-to-follow guide (http://www.bluetooth.org/Events/Training/eplTraining.htm)_. Remember that an EPL can be updated (with pictures, descriptions, URLs, etc.) at any time."_

- Reference: Bluetooth.org (http://www.bluetooth.org/ticketing/view_article.cfm?action=article_comment&aid=275)

Qualified Design Listing

Texas Instruments Dual Mode Bluetooth solutions have the following Qualified Design Listings (QDL (https://www.bluetooth.org/tpg/listings.cfm)) with corresponding Qualified Design Identification (QDID)

Product Type	Component	Controller Subsystem	Host Subsytem	Profile Subsystem
QDID	QDID 54666 (https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=22263) - CC256xB v4.1 QDID 27219 (https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=17041) - CC256xA	QDID 55257 (https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=22476) - CC2564MODN v4.1 QDID 58852 (https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=23589) - CC256xB QFN v4.1 QDID 51252 (https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=21898) - CC256xB QFN v4.0 QDID 48047 (https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=21257) - CC256xA QFN	QDID 69887 (BT 4.0) (https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=25551) - TI Bluetooth - Based on Bluetopia 4.0 (*New*) [1] QDID 85355 (BT 4.2) (https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=32797)	QDID 42849 (https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=20402) - Bluetopia 4.0 (*Legacy*) [2] QDID 69886 (https://www.bluetooth.org/tpg/QLI_viewQDL.cfm?qid=25552) - TI Bluetooth - Based on Bluetopia 4.0 (*New*) [1]
Includes	HCI Link Layer RF PHY. *(This applies to both packages QFN and WSP since it involves chip level testing only.)*	QFN Reference Design. *(This type of certification includes chip and pcb layout. Therefore, the existing QFN Controller Subsystem QDID applies only to our QFN solution(QFN chip + QFN Reference Design)).*	GAP GATT ATT SMP L2CAP HCI	Health Thermometer Profile/Service Device Information Service Find Me Profile Immediate Alert Service Link Loss Service Proximity Profile Tx Power Service Heart Rate Profile/Service Time Profile Phone Alert Status Profile Alert Notification Profile Blood Pressure Profile/Service Battery Service HID Service Scan Parameters Service HID over GATT Profile Scan Parameters Profile Running Speed and Cadence Profile/Service Cycling Speed and Cadence Profile/Service Serial Port Profile (SPP) Hands Free Profile (HFP) Human Interface Device (HID) and some more...

1. *New* - Includes the following packages:
   - CC256XSTBTBLESW (http://www.ti.com/tool/CC256XSTBTBLESW)
2. *Legacy* - Includes the following packages:
   - CC256XMSPBTBLESW (http://www.ti.com/tool/CC256XMSPBTBLESW)
   - CC256XM4BTBLESW (http://www.ti.com/tool/CC256XM4BTBLESW)

These can be used as reference when creating a New Product Listing.

Create an End Product Listing

If you have copied a TI QFN EM board reference design, simply;

1. Follow the EPL guide (http://www.bluetooth.org/Events/Training/eplTraining.htm)
2. Use our QDIDs as a reference when completing the EPL Form

If you have created your own RF Circuitry, you need to perform PHY test before creating the EPL to ensure that your design is compliant.

CC256x RF PIXIT

CC256x Protocol Implementation eXtra Information for Test, PIXIT

PIXIT Reference	Identifier	Value	Units (*if applicable*)	Comments
RF:P1	Timer for TX power control	5	ms	TRM/CA/03 Power Control, **Note 1**
RF:P2	Inband Image frequency	-1	MHz	RCV/CA/03 C/I Performance, **Note 2**
RF:P3	Value **n** for Intermodulation test	3	Integer	RCV/CA/05 Intermodulation Performance, **Note 3**
RF:P4	Inquiry Scan duration	5	ms	TRC/CA/01 Out of Band Spurious Emissions
RF:P5	Inquiry Scan interval	5	ms	TRC/CA/01 Out of Band Spurious Emissions
RF:P6	Type of power source	*Battery or External Power*	N/A	*Customer Dependent* - Chapter 6.4, RF Test Specification
RF:P7	Nominal power source voltage	*Voltage - Typical Value*	V	*Customer Dependent* - Chapter 6.4, RF Test Specification

RF:P8	Operating temperature range (Tmin, Tmax)	*Temperature Range*	Celsius	*Customer Dependent* - Chapter 6.4, RF Test Specification
RF:P9	Extreme power source voltage (Vmin, Vmax)	*Voltage Range*	V	*Customer Dependent* - Chapter 6.4, RF Test Specification
RF:P10	Antenna Gain (Vmin, Vmax)	*Antenna Gain*	dBi	*Customer Dependent* - Chapter 6.4, RF Test Specification, refer to Antenna Datasheet

- **Note 1:** Time [ms] required by the IUT to reach the next power step. Tester will wait this amount of time before starting the next power measurement. Default value is 1 second.
- **Note 2:** $F\_image = F\_wanted + x$ MHz, where x is twice the intermediate frequency.
- **Note 3:**
  - $f\_tx = 2*f1 - f2$
  - $|f2 - f1| = \textbf{n} * 1$ MHz
  - f_tx : wanted signal
  - f1 : static sine wave interferer
  - f2 : Bluetooth modulated signal interferer
  - **n** is 3, 4 or 5

FAQ

I have created a design similar to the QFN EM board but smaller, can I refer to the TI QDIDs in my EPL?

If you have created your own RF Circuitry, you need to perform PHY test before creating the EPL to ensure that your design is compliant. Contact a test house (including BQE) for a consultation .

What Bluetopia stack components have passed the certification?

See table in the *Qualified Design Listing* section.

What is the difference between QDL and EPL?

QDL is qualified as a design, requires member to pay a listing fee. EPL is for products that reference the QDL and is FREE.

What is a Bluetooth Qualification Expert (BQE)

- Individual recognized by the Bluetooth SIG to provide a Bluetooth member with qulification related services
- Expert in understanding the qualification policy and process
- Optional for members to use them

Can you recommend some BQEs to work with?)

A list of BQEs can be found here (https://www.bluetooth.org/en-us/test-qualification/member-network/qualification-testing-services) You can choose from the list, for example, AT4 wireless (http://www.at4wireless.com/index.html).

References

Main Bluetooth SIG site (http://www.bluetooth.org)

End Product Listings (https://www.bluetooth.org/tpg/listings.cfm)

SIG Qualification overview (https://www.bluetooth.org/en-us/test-qualification/qualification-overview)

Keystone=

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1. switchcategory:MultiCore=

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- For questions related to the BIOS MultiCore SDK (MCSDK), please use the BIOS Forum

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